CONCERTED ACTION
ENERGY PERFORMANCE OF BUILDINGS

EPBD implementation in the Slovak Republic

Status in December 2016

AUTHORS

Zuzana Sternova, *Building Testing and Research Institute (TSUS)*, Jan Magyar, *Slovak Innovation and Energy Agency (SIEA)*

NATIONAL WEBSITES

www.mindop.sk, www.inforeg.sk, www.mhv.sk, www.siea.sk, www.sksi.sk

1. Introduction

The Slovak Republic began implementing Directive 2002/91/EC on 1 January 2006 by way of Act 555/2005 for the Energy Performance of Buildings. Furthermore, Decree 625/2006 of the Ministry of Construction and Regional Development of the Slovak Republic entered into force on 1 January 2007. To obtain a building permit, designers had to present evidence proving that the energy rating of the designed building met the legal minimum performance requirements. Minimum performance requirements were defined and established as mandatory since 1 January 2007. EPCs have been issued since January 2008. A new decree from the ministry came into force on 1 October 2009 introducing specific changes to the calculation process following European standards; the template of the EPC was changed. Since 1 November 2010, the responsibility for the energy performance of buildings lies with the Ministry of Transport, Construction and Regional Development (MDVRR SR). The Ministry of Economy is responsible for the regular inspection of boilers and AC systems in buildings.

Directive 2010/31/EU has been implemented by Act 300/2012 on the energy performance of buildings, which amended and supplemented Act 555/2005. The new Decree 364/2012 entered into force in January 2013. This introduced the definition of NZEB, and the global indicator for total energy use in buildings was changed to primary energy use, which also altered the EPC template. The decree sets out a gradual tightening of the minimum requirements for the years 2013, 2016 and 2021.

Since 1 January 2017, an amendment of Decree 324/2012, which provides a new method for the energy certification of building units, came into force. It also introduced a change to some primary energy factors and presented the template of the EPC.

2. Current Status of Implementation of the EPBD

The implementation of the EPBD has led to a phased tightening of the minimum requirements for the energy performance of buildings. This tightening is based on the rate of construction of high energy performance buildings. These will be followed by NZEB requirements for all new buildings starting in 2021. Renovated existing buildings must meet the requirements for new buildings when technically, functionally and economically feasible.

Requirements on the U-value of building envelope components and the energy needed for the heating of buildings are set in the national standard (STN) for thermal protection. A revision of STN 73 0540-2:2012 set the gradual tightening of requirements. The fixed requirements of ultra-low energy buildings were adjusted on 1 August 2016 for roofs and structures above the external open spaces following the results of cost-optimal studies on the levels of minimum energy performance requirements.

2.I. Energy performance requirements: NEW BUILDINGS

2.I.i. Progress and current status of new buildings

Requirements for the energy performance of new buildings have been set since 2016. According to these, new buildings, including new public buildings, should fulfil the requirements set for ultra-low energy construction and achieve the global indicator for energy class A1 (until the end of 2015, energy class B was the requirement for low-energy buildings). Heat recovery systems with a minimal efficiency of 60% for the ventilation of spaces is further required. The requirements for the global indicator for primary energy are set depending on the category of the building. New public buildings must fulfil NZEB requirements from 1 January 2019. The requirements on building components are the same for residential and non-residential buildings.

2.I.ii. Format of national transposition and implementation of existing regulations

The EPBD has been incorporated into Slovakian legal documents (act and ministerial decree). RES and heat recovery are now mandatory in new buildings. Requirements for the thermal protection of the envelope components and buildings are presented in the national standard STN 73 0540-2:2012/Z1:2016[1] (Table 1). The revised standard, which came into force on 1 August 2016, respects cost-optimality calculations. The process of the energy performance calculation is described in the Annex of the Ministerial Decree 364/2012[2] and refers to standardised calculation methods. The whole package of CEN standards was implemented and included into Slovak Technical Standards (STN). More than 50% of the CEN standards

were translated into the Slovak language and issued as STN EN standards. The monthly method is used for calculating the energy performance. The calculations are worked out separately for thermal protection and for the energy use for heating, cooling and ventilation, as well as for hot water preparation and lighting. Calculating primary energy is based on calculated delivered energy and primary energy factors. New primary energy factors are stated in the Ministerial Decree 324/2016[3], in force since 1 January 2017. Primary energy factors for electricity decreased from 2.764 to 2.2. Primary energy factors for district heating should be calculated following the Ministerial Decree 308/2016[4].

Structure / component	U-value W/(m^2.K)			
	Maximum value[1)] U_{max}	Standardised (required) value Low energy level of construction U_N from 1 January 2013	Recommended value Ultra low-energy level of construction standardised (required) U_{r1} from 1 January 2016	Target recommended value NZEB level of construction standardised (required) U_{r2} from 1 January 2021
External wall and pitched roof with a slope > 45°	0.46	0.32	0.22	0.15
Flat roof and pitched roof with a slope ≤ 45°	0.30	0.20	0.15	0.10
Windows, doors in external walls	1.70	1.40	1.00	0.60

Table 1. Requirements for the U-value of selected building envelope structures.

2.I.iii. Action plan for progression to NZEB for new buildings

The national action plan for NZEB reflects the requirements and the streamlining of legal documents in order to implement NZEB standards. The milestones are presented as intermediate objectives and targets focused on 2016 (ultra-low level of construction and 2021 level of NZEB construction). The definition of NZEB has been transposed into law and extended by highlighting the importance of the efficient thermal protection of buildings. A definition of NZEB is presented in the law, in force since 2013. At least 50% of the energy used in NZEB should be covered by RES. Implementing heat recovery systems/units with an efficiency higher than 60% is also required. The date set for the construction of new public NZEB is 1 January 2019. The national action plan requires that the design documentation for new public buildings should be in line with NZEB requirements when asking for a building permit by 31 December 2018. For all new buildings, the date required for design documentation to be in line with NZEB requirements is 31 December 2020.

Building components for new buildings should correspond to the requirements set by national standard STN 73 0540-2:2012 for the building envelope, with separate values for external walls, roofs, windows and dividing structures between heated and unheated spaces. Since 1 January 2016, the requirements were adjusted following the cost-optimality calculation results.

At present, there are no examples of completed NZEB in the country. Some buildings are in the design stage, reflecting the requirements for building envelope components and the global indicator for primary energy, and implementing RES, heat recovery systems and smart metering systems.

The action plan presents the gradual tightening of requirements with the global indicator for primary energy as the performance value. Energy class A1 is required since 1 January 2016, whereas NZEB should achieve energy class A0 for the global indicator as a performance value, starting 1 January 2021.

2.I.iv. Requirements for systems and / or building components for new buildings

There are no regulations defining the minimum efficiency of any technical building system as a whole. There are only specific requirements in regulations related to individual elements (e.g., boilers, pipework insulation, etc.). Technical building system requirements are mainly based on European (EN) or national (STN) standards. There are minimum requirements set for heating, cooling and ventilation, as well as for domestic hot water. In addition, building designers must assess the possibility of technical, environmental and economic utilisation of high-efficiency alternative energy systems (active solar heating systems and other heating systems and electrical systems based on RES; combined heat and power; district or block heating and cooling) before the construction begins. The energy requirements are not prioritised over health and safety or other technical requirements.

2.II. Energy perrformance requirements: EXISTING BUILDINGS

2.II.i. Progress and current status of existing buildings

The building code states that all construction works must fulfil essential requirements. The gradual tightening of requirements for energy performance started in 2013. From 2016, major renovations had to meet the requirements for ultra-low energy construction, namely energy class A1, if technically, functionally or economically feasible. To meet the requirements for the global indicator for primary energy, a major renovation of technical systems is also needed. Deep renovation includes changes to technical systems as well, including changes connected to the heat and hot water generation and distribution. In the event that it is not possible to change the efficiency of the device (e.g., the owner of the renovated building is not able to influence the primary energy factor), the renovated building must meet energy class A for the total energy use of the building. The energy rating is focused on technical systems for heating and domestic hot water preparation when the residential buildings are renovated, as well as for cooling, ventilation and lighting when non-residential buildings are renovated. Implemented measures should be cost-effective, where possible. The payback time of the measures proposed in the EPC should be less than 15 years.

2.II.ii. Plans to improve the existing building stock

The first draft of the Slovak “Strategy for the rehabilitation of the residential and non-residential building stock” towards improved energy efficiency, prepared under Art. 4 of the Energy Efficiency Directive (EED), was approved by Government Resolution 347/2014 (in July 2014). The renovation of buildings shall continue for a total of 29,000 apartment building units and 22,000 family houses annually, thus targeting a large proportion of the building stock constructed during the period of 1948-1992. At the end of 2016, 58.33% of apartment units in multi-family houses and 36.77% of single-family houses had been renovated. The average number of multi-family houses renovated annually during the last three years is 29,163 and 19,450 units of single-family houses have been renovated so far. The majority of renovated buildings followed the minimum energy performance requirements valid at the time of carrying out the construction

works. In the future, a deep renovation process will be necessary; unitl now, only major building renovations have been provided in all the cases. Major technical building systems renovation must now be realised as well.

According to the EED, energy audits have been carried out on buildings owned by the central government and were accompanied by progressive design documentation for building permits. Renovation works are generally financed using EU structural funds. There is no statistical data for the renovation of non-residential buildings available as of yet.

2.II.iii. Regulation of system performance, distinct from whole building performance

There are no specific technical requirements for systems installations as a whole in new and renovated buildings. New and existing buildings must only meet global minimum energy performance requirements. Regulations 422/2012[5] and 328/2005[6] define the minimum combustion efficiencies of boilers. Act 321/2014[7] on energy efficiency obliges owners of large buildings (with a total floor area larger than 1,000 m^2) to ensure that a distribution network of heat and domestic hot water is installed using suitable thermal insulation. Regulation 282/2012[8] defines those technical requirements.

Regarding other products used in technical building systems, specific requirements are to be found in implementing regulations related to the Ecodesign directive. In addition, there are specific requirements depending on the size of the building. The owner of a large building with a water-based central heating system is obliged to:

- ensure and maintain hydronic balancing of the heating system in the building;
- equip the heating system with equipment used for the automatic control of heating medium parameters for each heating appliance depending on the air temperature in heated rooms.

The owner of a building with central domestic hot water generation is obliged to:

- ensure and maintain hydronic balancing of the domestic hot water distribution system in the building.

After completing the works in a building, the owner should have performed the above-mentioned technical measures; this is one of the conditions for obtaining a building permit. In the event of non-compliance, the owner could be fined from 200 € to 8,000 € if detected by State energy inspection officials.

Table 2 is an example of requirements for individual technical elements.

	Minimum thickness of thermal insulation of heat and hot water distribution pipes made from steel pipes for thermal insulating material with a thermal conductivity of 0.035 W/(m.K) at 0 °C	
No.	Internal diameter of piping or fittings	Minimum insulation thickness
1	to 22 mm inclusive	20 mm
2	over 22 mm to 35 mm inclusive	30 mm
3	over 35 mm to 100 mm inclusive	the same as the internal diameter of the pipe
4	over 100 mm	100 mm
5	For heat distributors and heat collectors, in pipe crossings, in pipe joints and for pipes and fittings installed in wall and ceiling transitions, the minimum insulation thickness may be reduced by 50% of the insulation thickness specified in the relevant row of the table	

Table 2. Requirements for thermal insulation of pipes.

2.II.iv. Encouragement of intelligent metering

Based on the cost-benefit analysis of Distribution System Operators (DSOs), Decrees 358/2013[9] and 168/2015[10] were adopted. The decrees set a condition that at least 80% of delivery points for final customers whose annual electricity consumption is more than 4 MWh shall be equipped with an intelligent metering system (IMS) by December 2020.

The supplier of heat and domestic hot water is obliged to provide the customer with a meter that shows the actual heat consumption as well as the time of consumption. Similar obligations are valid for gas supply also.

The Regulatory Office for Network Industries (RONI) encourages DSOs to accelerate the deployment of intelligent metering before the deadlines stated in Decree 168/2015, to provide advice and information to customers, update the displayed measurement data frequently enough so they can be used to save energy, create, design and offer standardised interfaces, which would enable energy management in “real time”, and provide measurement results directly to the customer.

Intelligent metering does not in itself generate energy savings, since savings are generated by the actions of the occupants based on information from the metering system; therefore, such systems are not part of the normalised energy performance calculation. As such, installation does not influence the energy class of the building in the EPC or in the energy label.

2.II.v. Financial instruments and incentives for existing buildings

Since 1997, the main financial tools supporting the renovation of residential buildings were provided by the State fund for the development of the housing stock (SFRB). The conditions for credits are set in Act 150/2013[11] and ministerial decrees determining the type and height of provided credits and subsidies. Financial tools focus on multi-family houses. The total amount of credits for the period 2014-2016 represents 416.34 million € for the renovation of 89,258 apartments. Funding of single-family houses from SFRB was at a very low level. In order to increase the interest of owners to undertake major renovations of single-family houses (ensuring energy savings), a new programme was set up in 2016 targeting the low level of renovated existing single-family houses (33.67%)[12]. The highest possible grant is 8,000 € per single-family house.

The "*Greenlight for households*" project[13] is focused on subsidies for PV systems, solar thermal collectors, biomass boilers and heat pumps. Until now, 5,000 systems were supported with a total grant amount of 11 million €.

For the renovation of non-residential buildings, structural funds are generally used[14].

2.II.vi. Information campaigns / complementary policies

Information campaigns are organised through TV specials (broadcasted monthly), focusing on energy certification, measures recommended for major and deep building renovations, construction products, as well as information about technical building systems and components. Similarly, there are also radio broadcasts focusing on energy certification. Information about the energy performance of buildings is available at www.mindop.sk. There are already some ongoing information campaigns, e.g. "*Live with Energy*" and "*Energy for you*".

2.III. Energy performance certificate requirements

2.III.i. Progress and current status on sale or rental of buildings and EPCs

The number of sold and rented buildings with EPCs increases from year to year, but nevertheless the overall proportion of the total building stock with EPCs is very low. The total number of issued EPCs in 2016 was 16,229 (Figure 1) and the number of sold buildings and rented buildings with EPCs was 133 and 668, respectively. The number of EPCs issued in 2015 for sold buildings and rented buildings was 277 and 205, respectively. The total number of EPCs issued in 2015 was 14,276 and in 2014 the number of issued EPCs was 13,866. The summary of issued EPCs as regards building categories and energy classes is presented in Table 3.

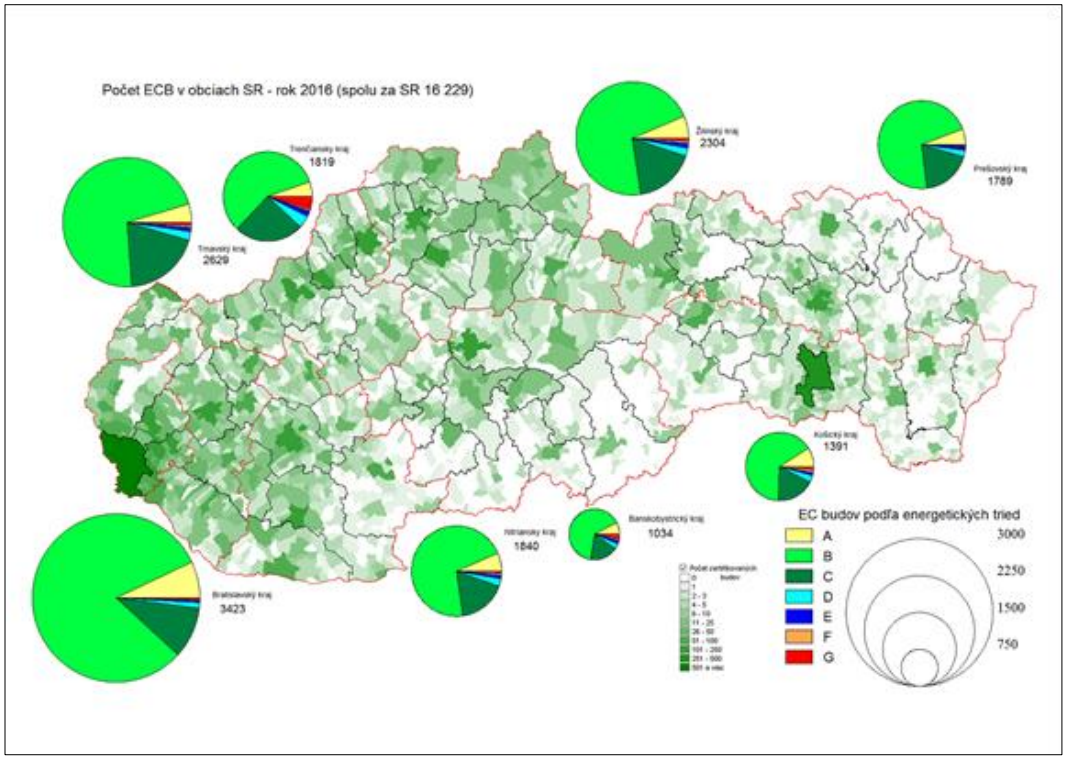

Figure 1. The number of EPCs in different regions of the Slovak Republic in 2016.

Building category	Total number	Energy class							
		A0	A1	B	C	D	E	F	G
Single-family houses	**12,996**	1,493	4,432	5,401	1,408	198	35	19	10
Multi-family houses	**1,807**	89	111	1,130	317	63	20	25	52
Office buildings	**432**	8	38	197	110	43	12	9	15
Educational buildings	**157**	1	4	59	52	14	14	5	8
Hospitals	**27**	2	3	15	4	2	-	-	1
Hotels and restaurants	**115**	9	17	57	20	7	5	-	-
Sport facilities	**35**	-	3	14	9	6	1	1	1
Wholesale and retail services buildings	**439**	2	40	190	117	55	15	5	15
Wholesale and retail services buildings	**221**	5	37	120	38	6	10	3	2
Total	**16,229**	**1,609**	**4,685**	**7,183**	**2,075**	**394**	**112**	**67**	**104**

Table 3. Summary data on performed EPCs in 2016 according to building categories and energy classes.

In accordance with Ministerial Decree 324/2016, which amends and supplements Ministerial Decree 364/2012, the responsibility for owners to obtain an EPC when renting or selling an individual apartment or parts of a building came into force on 1 January 2017 (Figure 2 and 3). A score is granted, depending on the quality of the thermal protection of structures and the performance of heating and domestic hot water systems in the individual building unit, expressing the level of construction. The final rating is expressed using pictograms (smilies). The energy certificate template consists of 4 pages and the maximum validity of issued EPCs is 10 years.

Figure 2. First page of the EPC template for individual apartments or building units.

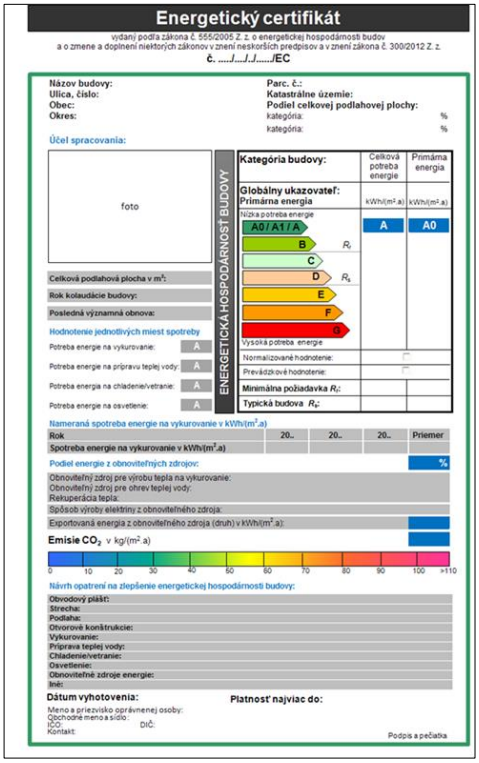

Figure 3. First page of the EPC template for residential, non-residential and public buildings.

2.III.ii. Quality Assurance of EPCs

Since 2014, the State Energy Inspection, as part of the Slovak Trade Inspection, has been responsible for the quality assurance of EPCs. A system of random control is under development.

Energy certificates for individual apartments or building parts are worked out online and every step from start until the issuing of the certificate is controlled by software.

2.III.iii. Progress and current status of EPCs on public and large buildings visited by the public

Energy certification and display is mandatory for buildings used by public authorities with a total floor area of more than 250 m^2 (until 9 July 2015 it was for more than 500 m^2) or for buildings that are frequently visited by the public.

There is no appropriate information on the display of EPCs that is available at the moment. The Slovak Trade Inspection is in charge of checking that EPCs are publicly displayed, but as of 2016 the control had not yet been completed.

The format and content of the EPC for public and large buildings that are visited by the public are the same as for other buildings when sold or constructed. EPCs for public and large buildings visited by the public are also valid for 10 years unless the building is renovated and there is a change in the energy use.

2.III.iv. Implementation of mandatory advertising requirement – status

Act 555/2005[15] on the energy performance of buildings implements mandatory advertising requirements which have been in force since January 2013. In cases where the building is sold or rented, the building owner is required to indicate in commercial media advertisements the information about the energy class of the global indicator from the EPC. The Slovak Trade Inspection is in charge of control checks. At the end of 2016, the control had not yet been completed.

2.IV. Inspection requirements – heating systems, air conditioning

The Slovak Republic decided to use the option of regular inspections, both for heating and AC systems, in response to Articles 14/15 of the EPBD (Directive 2010/31/EU). Regular inspections were made mandatory on 1 January 2008. The Ministry of Economy is responsible for the area of regular inspection of both heating and AC systems in buildings. The legal basis for both follows from Act 314/2012. There are two linked decrees:

- Decree 422/2012, which lays down the requirements for the procedure of regular and extended inspection of heating systems and the regular inspection of AC systems;
- Decree 44/2013, which defines the details of the examination procedure that qualified experts need to follow, in order to carry out the regular inspection of heating and AC systems.

There is a common set of minimum required information in the inspection reports and a report template is provided by the SIEA. Act 314/2012 contains framework information on the content of the report which is then supplemented by Decree 422/2012. The training and examination procedures for qualified experts follow the same structure for both heating and AC system inspections. Support is provided by SIEA; additionally, the Slovak Association for Cooling and Air Conditioning Technology provides experts qualified to perform AC inspections.

2.IV.i. Report on equivalence of model A and B for Heating Systems

The Slovak Republic decided to use the option of regular inspections, both for heating and AC systems; no report is provided.

2.IV.ii. Progress and current status on heating systems

Inspections of heating systems are based on the assessment of efficiency under defined normal working conditions. Currently, inspections of heating systems must follow the reference methodologies, partially based on EN standards, (e.g., EN 15378). A detailed national methodology is defined in Decree 422/2012. The regular intervals of inspection depend on the thermal output of the heating system, the type of fuel and the type of building (residential/non-residential). Since the end of 2013, all boilers under the scope of Act 314/2014 in all buildings with a nominal thermal output of the boiler above 30 kW should be inspected; since 2014 boilers above 20 kW in non-residential buildings which are fuelled by fossil solid, liquid and gaseous fuels (with the exception of natural gas) should be inspected as well (Table 4).

Nominal output of boiler [kW]	**Fuel**	**Interval of regular inspection [year]**	
		Single-family houses and Residential houses	Office buildings, schools and educational buildings, hospitals, hotels and restaurants, sport facilities, wholesale and retail trade buildings, other types of energy-consuming buildings
In the range of 20 (incl.) to 30	Fossil solid, liquid and gaseous fuels except natural gas	10	7
	Natural gas	15 (first inspection at the latest in 31.12.2022)	12 (first inspection at the latest in 31.12.2019)
	Biomass, biogas	15	12
In the range of 30 (incl.) to 100	Fossil solid, liquid and gaseous fuels except natural gas	4	4
	Natural gas	6	6
	Biomass, biogas	6	6
Above 100 (incl.)	Fossil solid, liquid and gaseous fuels except natural gas	2	2
	Natural gas	3	3
	Biomass, biogas	2	2

Table 4. Intervals of regular inspections of boilers and heating.

There are 200 licensed bodies and 255 qualified experts registered for the regular inspection of heating systems (2016).

Inspections are ordered and paid for by the owner of the building or by the contractual administrator of the building or system. Building owners (or administrators of buildings or systems) are required to:

- arrange regular inspections of heating systems;
- keep inspection reports until a new one is received at the next periodic inspection;
- submit the last inspection report to the new owner in the case of transfer or reassignment of the ownership of the building;
- provide a copy of the latest inspection report to tenants when renting a building or heating system.

Summary data on performed inspections of heating systems including boilers in the period of 2010 – 2015 according to received inspection reports is presented in Table 5.

Data	Unit	Year					
		2010	**2011**	**2012**	**2013**	**2014**	**2015**
Number of inspected boilers	boiler unit	1,018	363	227	1,201	970	1,015
Total heat output of inspected boilers	MW	273.13	52.28	40.09	163.67	166.61	150.78
Number of LBs who sent reports	-	18	22	20	33	37	29
Share of boilers not fulfilling the required combustion efficiency out of the total number of inspected boilers	%	6.5	6.1	3.1	5.3	6.2	5.3
Share of boilers older than 15 years out of the total number of inspected boilers	%	23.1	28.7	36.2	19.8	35.6	26.9
Number of performed expanded heating systems inspections with boiler older than 15 years	Inspection	65	27	47	134	226	172

Table 5. Summary data on performed inspections of heating systems including boilers during 2010 – 2015 according to received inspection reports.

2.IV.iii. Progress and current status on AC systems

Inspections of AC systems are based on the assessment of efficiency under defined normal working conditions and must follow the reference methodologies, among others, based on EN standards, e.g., EN 15240. A detailed national methodology is defined in Decree 422/2012. The regular periods of inspection depend on the cooling output of the inspected AC system (Table 6). Inspections are ordered and paid for by the owner of the building or the contractual administrator of the building or the system. The requirements on building owners (or administrators of buildings or systems) are the same as for heating system inspections. Promotional activities are similar to the activities performed in case of inspecting heating systems.

There are 65 licenced bodies and 103 qualified experts registered for the regular inspection of AC systems (2016).

The first summary report has been prepared for inspections that were undertaken in 2011. For 2015, inspections should be implemented for all AC systems with a cooling output of over 50 kW (Table 6). The main summary data for the period 2011 – 2015 are given in Table 7.

Nominal cooling output of AC system [kW]	Interval of regular inspection [year]
In the range of 12 (incl.) to 50	8
In the range of 50 (incl.) to 250	6
In the range of 250 (incl.) to 1,000	4
Above 1,000 (incl.)	2

Table 6. Intervals of regular inspections of AC systems.

Data	Unit	Year				
		2011	2012	2013	2014	2015
Number of inspected AC systems/cooling units	system	32/32	2/10	49/49	151/151	448/448
Total cooling output of inspected system units	MW	4.32	4.50	12.00	53.0	63.23
Number of LBs who sent reports	-	2	1	11	6	6
Number of inspected AC systems/units installed in office buildings	-	13	2	27	85	81
Number of inspected AC systems/units installed in retail buildings	-	0	0	13	38	331

Table 7. Summary data on performed inspections of AC systems during 2011 – 2015 according to received inspection reports.

2.IV.iv. Enforcement and impact assessment of inspections

Enforcement and penalties

For the purposes of monitoring, once a year, at the latest by 31 January, licenced bodies are required to send an electronic copy of all inspection reports produced in the previous year to the SIEA (on behalf of the Ministry). The owner or administrator of a building or a system may be fined if he/she does not arrange an inspection before the set date (Tables 4 and 6), does not keep the inspection report until receipt of the report from the next periodic inspection, does not submit a report from the last inspection to a new owner, or does not provide a certified copy of the report from the last inspection to a tenant. Owners, however, are not fined for a negative inspection result. The owner (or administrator) is not required to implement the recommendations that the qualified expert includes in the inspection report.

The Slovak Trade Inspection is responsible for compliance checking for both inspection systems. If, during the control, it is found that the inspections carried out by certain qualified experts are not undertaken in accordance with the regulations, the ministry is allowed to remove that particular qualified expert from the register. So far, only one expert has been removed from the list of qualified experts in 2013, but this was for reasons other than shortcomings identified by supervisors. If a licenced body fails to send the report from the inspection to the ministry, it can be fined up to 200 €.

Quality control of inspection reports

All inspection reports are registered in the monitoring system administered by the SIEA. The ministry (or the SIEA on behalf of the ministry) checks a statistically significant percentage of inspection reports received every year, and at least one inspection report submitted by each licensed body is inspected. Quality control is similar for both inspection systems and is focused on formal fulfilment of the legislative requirements, but the content is also checked, in particular the calculation procedure and final results written in the particular report. Key findings are subsequently followed up in the training process. In 2015, six licenced bodies produced 188 AC system inspection reports, from which 12 reports were checked for quality. Regarding the heating system inspections, 29 licenced bodies sent 522 inspection reports, and 29 of those reports were quality checked.

Impact assessment. Costs and benefits

The findings of quality checks carried out on inspection reports were incorporated in improvements to the training process and were communicated during the regular professional re-training (50 qualified experts in 2015). Key findings and recommendations based on the analysis of regular inspection reports were communicated during information activities, meetings and conferences featuring state authorities, public bodies and municipalities and were taken into account in the preparation of energy efficiency supporting measures and in the fourth National Energy Efficiency Action Plan (NEEAP)[16].

3. A success story in EPBD implementation

A particular success of the Slovak Republic in relation to creating the implementation system which focuses on the energy performance of buildings, is the strong interlinkage of different policies and steady improvements. The Slovak Republic started to implement the EPBD in 2005; since that time, the general principles and methods of energy performance certification have remained constant. The system was developed, refined and extended in accordance with changes in the EPBD and European Standards, new knowledge and the development of common conditions for the energy performance of buildings. A very important aspect for the successful implementation of the EPBD was the introduction of definitions related to the energy performance of buildings, but also the extension of terms cited in the EED.

The implementation process in relation to the EPBD was supported by CEN standards that were translated into the Slovak language. All of these standards were transposed into the Slovak technical standards system.

Defining these concepts also requires determining the conditions upon which loans to carry out major renovations are granted. Upon the request of grants or loans, the documentation should indicate that all the requirements of the EPBD can be achieved.

Research work conducted since 1992 included pilot and demonstration projects, which aimed at reducing energy use and the consumption of energy at the very least. The obtained results were used for the revision of thermal protection standards, but also for setting regulations on the energy use of technical systems, leading to a decrease in energy demand supplied by RES. In 2012, a path was set for the gradual tightening of requirements concerning the thermal protection of building envelope components and the energy performance of buildings towards the NZEB energy level of construction. This influenced the innovation and change in market conditions for construction products. All the achieved results influence the continuous improvements in the housing stock and the implementation of new conditions for overall policy integration, which has led to energy savings and improvements to the energy performance of buildings. Newly implemented procedures raise the energy awareness of building owners and mobilise them to renovate buildings.

4. Conclusions, future plans

The EPBD was implemented under Act 555/2005 and amended by Ministerial Decree 364/2012, which came into force in January 2013. Since January 2008, EPCs have been issued for new buildings and buildings undergoing major renovations when either sold or rented. The template has also changed and a new one was presented in the 2013 decree. A methodology for the energy certification of individual apartments or building units came into force in 2017 when an EPC template was also provided. It is to be noted that the compliance control system is under development and should be fully functional in 2017.

Of great importance is supporting the extensive renovations of the building stock, focusing on deep renovations so as to achieve the NZEB level. This will require additional training of experts, especially as regards quality assessment. In addition, it will be necessary to extend information campaigns targeting owners, to provide the financial tools for supporting deep renovations, and to provide a step-by-step renovation process as well.

The main challenge is to engage all involved groups (designers, developers, providers, owners and tenants) in the effort to change their attitude towards the construction of NZEB, which will require a new architectural perspective concerning the use of new materials and technical systems, including heat recovery systems and smart metering, as well as the integration of RES.

Finally, the Slovak Republic aims to implement the second generation of all CEN standards related to the EPBD into the Slovak Technical Standards (STN) system.

Endnotes

1. STN 73 0540-2:2012/Z1:2016 Tepelná ochrana budov. Tepelnotechnické vlastnosti stavebných konštrukcií a budov. Časť 2: Funkčné požiadavky
2. Vyhláška Ministerstva dopravy, výstavby a regionálneho rozvoja Slovenskej republiky č. 364/2012 Z. z. z 12. novembra 2012, ktorou sa vykonáva zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov; *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2012/364/*
3. Vyhláška Ministerstva dopravy, výstavby a regionálneho rozvoja Slovesnkej republiky č. 324/2016 Z. z. z 30. novembra 2016, ktorou sa mení a dopĺňa vyhláška Ministerstva dopravy, výstavby a regionálneho rozvoja Slovenskej republiky č. 364/2012 Z. z., ktorou sa vykonáva zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov; *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2016/324/20170101.html*
4. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 308/2016 Z. z. z 24. októbra 2016, ktorou sa ustanovuje postup pri výpočte faktora primárnej energie systému centralizovaného zásobovania teplom; *www.slov-lex.sk/static/pdf/2016/308/ZZ_2016_308_20170101.pdf*
5. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 422/2012 Z. z. z 13. decembra 2012, ktorou sa ustanovuje postup pri pravidelnej kontrole vykurovacieho systému, rozšírenej kontrole vykurovacieho systému a pri pravidelnej kontrole klimatizačného systému ktorou sa ustanovuje postup pri pravidelnej kontrole vykurovacieho systému, rozšírenej kontrole vykurovacieho systému a pri pravidelnej kontrole klimatizačného systému sa ustanovuje postup pri pravidelnej kontrole vykurovacieho systému, rozšírenej kontrole vykurovacieho systému a pri pravidelnej kontrole klimatizačného systému; *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2012/422/20130101*

6. Vyhláška Úradu pre reguláciu sieťových odvetví č. 328/2005 Z. z. z 13. júla 2005, ktorou sa určuje spôsob overovania hospodárnosti prevádzky sústavy tepelných zariadení, ukazovatele energetickej účinnosti zariadení na výrobu tepla a distribúciu tepla, normatívne ukazovatele spotreby tepla, rozsah ekonomicky oprávnených nákladov na overenie hospodárnosti prevádzky sústavy tepelných zariadení a spôsob úhrady týchto nákladov; *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/328/20080301*
7. Zákon č. 321/2014 Z. z. z 21. októbra 2014 o energetickej efektívnosti a o zmene a doplnení niektorých zákonov; *www.urso.gov.sk/sites/default/files/z_321_2014.pdf*
8. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 282/2012 Z. z. z 18. júla 2012, ktorou sa ustanovujú technické požiadavky na tepelnú izoláciu rozvodov tepla a teplej vody; *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2012/282/vyhlasene_znenie.html*
9. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 358/2013 Z. z. z 28. októbra 2013, ktorou sa ustanovuje postup a podmienky v oblasti zavádzania a prevádzky inteligentných meracích systémov v elektroenergetike *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2013/358/20131115*
10. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 168/2015, zo 6. júla 2015, ktorou sa mení vyhláška Ministerstva hospodárstva Slovenskej republiky č. 358/2013 Z. z., ktorou sa ustanovuje postup a podmienky v oblasti zavádzania a prevádzky inteligentných meracích systémov v elektroenergetike; *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2015/168/vyhlasene_znenie.html*
11. Zákon č. 150/2013 Z. z. z 15. mája 2013 o Štátnom fonde rozvoja bývania v znení neskorších predpisov; *www.slov-lex.sk/pravne-predpisy/SK/ZZ/2013/150/*
12. Zákon č. 277/2015 Z. z. Zákon, ktorým sa mení a dopĺňa zákon č. 443/2010 Z. z. o dotáciách na rozvoj bývania a o sociálnom bývaní v znení zákona č. 134/2013 Z. z. a ktorým sa mení a dopĺňa zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov; *www.zakonypreludi.sk/zz/2015-277*
13. *http://zelenadomacnostiam.sk/sk*
14. Integrovaný regionálny operačný program 2014-2020; *www.mpsr.sk/download.php?fID=8962*
15. Zákon č. 555/2005 Z. z. z 8. Novembra 2005 o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení zákona č. 300/2012 Z. z. z 18. septembra 2012, ktorým sa mení a dopĺňa zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov a ktorým sa mení a dopĺňa zákon č. 50/1976 Zb. o územnom plánovaní a stavebnom poriadku (stavebný zákon); *www.slov-lex.sk/static/pdf/2005/555/ZZ_2005_555_20170615.pdf*; *www.slov-lex.sk/static/pdf/2012/300/ZZ_2012_300_20130701.pdf*
16. *https://ec.europa.eu/energy/sites/ener/files/documents/2014_neeap_sk_slovakia.pdf*

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